Alaska Department of Fish and Game
Division of Wildlife Conservation
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# Population Ecology and Spatial Dynamics of Wolves Under Intensive Management in the Nelchina Basin, Alaska

Howard N. Golden

Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Project 14.21

This is a progress report on continuing research. Information may be refined at a later date.

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# FEDERAL AID
# ANNUAL RESEARCH PERFORMANCE REPORT

**ALASKA DEPARTMENT OF FISH AND GAME**
**DIVISION OF WILDLIFE CONSERVATION**
**PO Box 25526**
**Juneau, AK 99802-5526**

**PROJECT TITLE:** Population ecology and spatial dynamics of wolves under intensive management in the Nelchina Basin, Alaska

**PRINCIPAL INVESTIGATOR:** Howard N. Golden

**COOPERATORS:** Layne Adams and Kyle Jolly, Biological Resource Division, U.S. Geological Service

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NR.:** W-33-1

**PROJECT NR.:** 14.21

**WORK LOCATION:** Nelchina Basin, Game Management Unit 13

**STATE:** Alaska

**PERIOD:** 1 July 2002–30 June 2003

## I. PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE 1: Determine the year-round prey selection patterns and kill rates of wolf packs relative to varying densities and distributions of prey – primarily moose and caribou – in and near the core calving areas.

We continued monitoring kill rates and diet using VHF telemetry and GPS telemetry systems, stable isotope analysis, and body composition measurements. Two to four wolves from each of several packs were radiocollared. During the year, we regularly located all collared wolves and backtracked the movements of the GPS-collared animals to determine their use of different prey items. We sampled blood for stable isotope analysis and conducted deuterium water dilution for analysis of body condition before and after calving.

OBJECTIVE 2: Investigate wolf movements and spatial relationships with prey.

We used VHF and GPS radio collars to monitor the movements of 2–4 wolves in each of several packs regularly during the year. We investigated spatial analysis techniques to measure wolf movements relative to the availability of moose and caribou.

OBJECTIVE 3: Evaluate diet and body composition of wolves relative to prey availability.

Stable isotope and body condition analysis focused on 3 periods relative to prey (moose and caribou) availability: (1) April — pre-calving and before caribou arrive in the area, (2) July

— post-calving for both prey species, and (3) October — autumn/early winter after caribou have left the area. We sampled as many wolves as possible during each capture period.

OBJECTIVE 4: Estimate wolf density relative to varying prey densities.

We conducted a density estimate using a sample-unit probability estimator (SUPE) of wolves in western Unit 13 and small portions of 13B and 13C in March 2002. Snow conditions were inadequate to conduct the SUPE in 2003. Estimates of moose and caribou densities were conducted by cooperators and other department staff.

OBJECTIVE 5: Estimate production, survival, and recruitment of wolves relative to varying prey densities.

During April captures, we used ultrasound techniques to examine pregnancy and the number of fetuses in female wolves. We also monitored den sites to estimate pup production, and we documented loss of wolves from dispersal, natural mortality, and harvest by humans.

## II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 2: Capture and Handling

During this performance period, we captured 24 wolves (13 females, 11 males) among 6 packs, using a chartered helicopter and Super Cub for support. Captures took place on 9–11 July 2002, 7–10 October 2002, 15–17 April 2003, and 27–28 May 2003. Of the 24 wolves captured, 8 were new captures and 16 were study animals that had been captured previously. We deployed GPS collars (Televilt/Telemetry Solutions ) on 12 wolves (1–2/pack) for varying lengths of time and collared the remaining wolves with conventional VHF collars (Telonics). For each wolf we measured weight (with an electronic load cell) and body size, estimated age (based on tooth wear), applied ear tags and a radio collar, extracted blood for stable isotope analysis as well as for potential DNA and disease analysis, biopsied a fat sample for fatty acid analysis, and noted general physical condition. We conducted deuterium water dilution tests on 16 wolves.

JOB 3: Prey Selection Patterns and Kill Rates

Location data collected by the GPS collars were remotely downloaded from the air and used to backtrack the movements and kill-site use by the wolves during the previous week. Collars deployed from July to October 2002 and April to June 2003 were set to gather locations every ½ hour each day. Collars deployed between October 2002 and April 2003 were set to record GPS locations every other week at half-hour intervals. We were able to backtrack the movements of collared wolves with relatively few gaps in their travel routes. We followed wolf travel routes and recorded their visits to sites of freshly killed or older carcasses of moose or caribou. We also recorded kill sites discovered during telemetry flights of the VHF collars. Remote download of GPS data was done every other week during calving and at 4-week intervals at other times. GPS download and backtracking flights took 1–2 days to complete. Conventional VHF locations were obtained nearly daily for most wolves during calving and up to 2- to 4-week intervals at other times.

JOB 4: Movements and Spatial Relationships with Prey

The GPS data downloaded remotely or directly from collars and data gathered through conventional VHF collars were compiled for comparative analyses with the movements of radiocollared moose and caribou. Data were collected on the schedule described above.

JOB 5: Diet and Body Composition

We collected blood, hair, and vibrissae samples from each of the wolves when captured. These samples were prepared in the lab for analysis of the presence of carbon and nitrogen isotopes that have specific signatures for moose, caribou, and other potential prey. Fat tissue samples were taken and stored for future fatty acid analysis. We also analyzed body composition through deuterium water dilution tests on blood sampled from 16 wolves. Each sample period took approximately 2 hours to complete. After injection of the deuterated water, blood samples were taken after 120 minutes. Blood samples were preserved for analysis to estimate water, lipid, protein, and ash content of each animal. We continued to prepare a manuscript of the results of this research (see Job 8 and section IV).

JOB 6: Density Estimation

Snow conditions throughout the study area were inadequate for conducting the SUPE.

JOB 7: Production, Survival, and Recruitment

We used ultrasound techniques to examine female wolves for pregnancy during captures on 15–17 April 2003. Of 3 female wolves examined, we detected at least 4 fetuses in a 6-year-old, 5–6 fetuses in a 2-year-old, and none in another 2-year-old. Out of 21 wolves monitored during this performance period, 7 are still alive, 10 were harvested, 1 died from an unknown cause, and 1 died from drowning in a small creek within 1 day after capture. We believe the latter death was capture-related and probably occurred while the wolf was recovering from sedation. Two other wolves are missing and are presumed to have dispersed.

JOB 8: Publications and Meetings

I coauthored a paper that has recently been published and another paper that is in preparation (see below).

## III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

I supervised the Fish and Wildlife Technician (FWT) positions for the Region II Research Section assigned to the Anchorage office. These positions provided support to this project during the performance period. This duty, which I have conducted since March 1995, involves hiring, supervising, and coordinating the work of a FWT IV and FWT III. Both positions are 11-month permanent-seasonal (P-S). In addition, I am responsible for hiring and supervising other temporary technicians or interns to assist seasonally as needed. During this performance period, I wrote evaluations and handled all personnel issues for these positions.

## IV. PUBLICATIONS

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. 2002. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 116: 132–134. **Note: This publication was late in being printed.*

Hilderbrand, G. V., and H. N. Golden. *In prep*. Body composition of free-ranging wolves. Journal of Mammalogy 000: 000–000.

## V. RECOMMENDATIONS FOR THIS PROJECT

I recommend reexamination of the efficacy of accomplishing all objectives for this study as originally planned due to the high loss of study animals and the expectation that this level of loss will likely continue for several years. During the next performance period, I will explore options and may revise the study plan to address objectives that can be met under current funding levels.

## VI. APPENDIX

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. 2002. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 116: 132–134.

*Abstract*: We report three instances of wolf predation on mustelids in Alaska; two involved wolverines and another involved an American marten. Such observations are rare and in previous studies usually have been documented indirectly. This account provides insight into the potential role of wolves in influencing mesocarnivore communities in northern environments.

Hilderbrand, G. V., and H. N. Golden. *In prep*. Body composition of free-ranging wolves. Journal of Mammalogy 000: 000–000.

*Abstract*: We used deuterium water dilution to determine body composition of free-ranging wolves (*Canis lupus*) in the Nelchina Basin, Alaska. Body mass differed between sexes throughout the year but did not vary within sex. Mean fat mass and mean energy content were highest in both sexes in the spring. Mean lean mass was lowest in both sexes in the spring. Body mass and lean body mass were positively related to animal age in males. There was no relationship between body fat content and animal age in either sex. Thus, growth in males beyond age 2 consists primarily of lean mass. Deuterium should be allowed to circulate in the wolf for at least 120 minutes to ensure complete equilibration regardless of season, sex, age, or reproductive status.

## VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $ 115,473 STATE SHARE $ 38,491 = TOTAL $ 153,964

**VIII. PREPARED BY:**

Howard N. Golden
Wildlife Biologist III

**SUBMITTED BY:**

Earl F. Becker
Acting Research Coordinator

**APPROVED BY:**

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Thomas W. Paul
Federal Aid Coordinator
Division of Wildlife Conservation

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Matthew H. Robus, Director
Division of Wildlife Conservation

**APPROVAL DATE:** __________________